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DOI:
10.1093/her/2.2.161

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (Harvard):
Hyner, GC, Petri, CJ, Melby, CL, Duda, J & Huddy, DC 1987, 'The effects of different health risk appraisal feedback on health-related behaviors in a worksite population', *Health Education Research*, vol. 2, no. 2, pp. 161-164. https://doi.org/10.1093/her/2.2.161

HEALTH EDUCATION RESEARCH
Theory and Practice

Vol.2 no.2 1987
Pages 161–164

SHORT COMMUNICATION

The effects of different health risk appraisal feedback on health-related behaviors in a worksite population

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Abstract

Three commonly used health risk appraisals (HRAs) and a control were utilized in a worksite population to determine their impact on employees' health-related behaviors. A generic questionnaire was developed which included non-redundant items from three different HRA instruments, and was distributed to all 495 employees of an insurance company. Two hundred employees returned usable questionnaires and were randomly allocated into three HRA groups and a control. Each HRA group received different HRA-generated computer feedback while the control group received general health information. A follow-up questionnaire was distributed 3 weeks after employees received HRA or control feedback to measure reported health-related behaviors and satisfaction with the feedback. Statistical analyses revealed no differences between the HRA feedback conditions and the control with regard to changes in employees' reported health behavior.

Introduction

The popularity of health risk appraisals (HRAs) is based on the premise that they effectively assess consumers' health risks and encourage the adoption of health enhancing behavior (Wagner *et al.*, 1982; Beery *et al.*, 1986). Most HRA instruments provide the user with feedback in the form of a computerized 'risk age'. Based on users' responses to behaviorally related questions, family and personal health history, and select physical variables such as blood pressure and serum cholesterol, a statistically generated risk age is compared with the individual's chronological age. Some HRAs calculate a 'risk score' as an alternative to the risk age. Favorable scores are presumed to reflect low levels of disease risk. Both forms of HRA feedback compare an individual's risk age or score to sex, race and age-matched population norms. Epidemiological evidence has identified certain characteristics deemed significant in increasing the risk of premature death. Such prognosticators are assigned weights relative to their association with disease and are used to modify the probabilities of dying from the leading causes of death within each gender, race and 5-year age group. Many HRAs provide users with a personalized assessment of their health risks which allows comparison with their peers regarding their probability of dying in the next 10 years (Goetz and McTyre, 1981; Schoenbach *et al.*, 1983).

The behavioral effects of HRA feedback, including users' perception of the usefulness of the information received, has not been adequately evaluated. This investigation examined the behavioral effects and degree of user satisfaction associated with three different types of HRA feedback and a control in a sample of employee volunteers from a regional office of a large insurance company.

Method

Subjects

All 495 employees were informed by inter-office memorandum that university health professionals would be offering a comprehensive health promo-

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tion program at the worksite preceded by dissemination of a generic HRA questionnaire (GQ). Two hundred employees (40%) returned usable questionnaires and were randomly allocated to one of three HRA experimental groups or the control. Following return of computerized HRA or control feedback to these subjects, a behavior change and perceived satisfaction follow-up questionnaire (FQ) was sent to each participant after a 3-week period. A total of 121 subjects returned the FQ (60% of those receiving feedback, 24.4% of the entire employee population). The mean age for this sample was 37 years (range 21–63). The 121 employee participants were predominently female (n = 76, 63%) and all employees were Caucasians. Less than 10% of the employees were in management positions. Most of the subjects were actuaries, data entry or clerical staff.

Procedures

In order to generate the three different HRA feedback conditions, a GQ containing non-redundant items required by the three original HRA instruments, was used. Four weeks after the return of the GQs to the investigators, the 200 respondents received one of three types of HRA or control feedback depending on their random group assignment.

Table I. *Items defining overall satisfaction with HRA or control feedback*

Item
The written material provided after completing the health questionnaire:
(i) was easy to understand
(ii) was helpful
(iii) was interesting
(iv) was confusing
(v) was useless information
(vi) was informative
(vii) was incomplete: I needed more information than was provided

Response options were as follows: 5 (strongly agree), 4 (agree), 3 (neutral), 2 (disagree) and 1 (strongly disagree).
Negatively weighted statements = 4, 5 and 7.
Positively weighted statements = 1, 2, 3 and 6.

Three weeks after receiving their individualized HRA or control feedback, subjects were sent the FQ. This instrument elicited subjects' opinions regarding the informative quality and utility of the feedback, and whether it stimulated them to change one or more of six possible behaviors as recommended by HRA and control feedback. A seven-item scale (Table I) was developed in order to determine subjects' overall degree of satisfaction with their HRA or control feedback. A five-point summated rating scale from 5 (strongly agree) to 1 (strongly disagree) was provided for each item. The reliability of the instrument (r = 0.84) was determined using Chronbach's alpha. Completed FQs were obtained from 121 subjects. The distribution of subjects among the four groups was as follows: HRA group 1 (n = 28), HRA 2 (n = 34), HRA 3 (n = 33) and the control group (n = 26).

HRA and control feedback

The quantity of personalized health information provided by the three HRAs differed markedly. The feedback received by HRA group 1 was generated from the Centers for Disease Control's HRA, version 2.1. In addition to a risk age, the CDC–HRA offers a list of health behaviors that should be maintained by the subject, as well as a list of risk behaviors that warrant modification. The same general information is provided by the commercially marketed HRA received by HRA group 2, except that risk status was in the form of a score. HRA group 3 received a popular HRA that yielded a risk age. However, the feedback was minimal, listing the top four or five lifestyle risk factors with little substantive explanation or reinforcement of positive behavior patterns. None of the HRA instruments required physical or biochemical data in order to calculate their respective risk ages or risk score. Most HRAs substitute average norms for blood pressure or serum cholesterol when they are not reported. No physical or biochemical measurements were performed on any of the employees in this study.

The control feedback consisted of general health recommendations on diet, exercise, smoking, stress management, ethanol consumption and use of automobile seat belts. The recommendations were

gleaned from readily available pamphlets distributed by public and voluntary health agencies. The investigators 'personalized' the control feedback by using colored markers to highlight items that were particularly important to each control group member based on their completed GQs. Unlike the three HRAs, however, control feedback contained no numerical or comparative risk assessment.

Analysis

A seven-item scale was used to assess subjects' general level of satisfaction with the HRA or control feedback they received. Possible scores ranged from 7 (very dissatisfied) to 35 (very satisfied). The three HRAs and control feedback groups were also compared with respect to subjects' reported behavior change. Comparisons between the four groups were subsequently carried out using analysis of variance. When the ANOVA revealed significant *F*-ratios, Tukey's test was used for *post hoc* comparisons of group means. The behavior change inventory was compared across the four groups using χ^2 analysis.

Results

Few subjects reported changing one or more select behaviors after receiving one of the three types of HRA or control feedback (Table II). However, χ^2 analysis revealed no statistically significant differences between the three experimental groups and control with regard to any of the self-reported behavioral changes.

Table III reveals statistically significant differences ($P = 0.028$) between the four groups with regard to subjects' overall levels of satisfaction with the feedback they received. However, pairwise *post hoc* comparisons failed to demonstrate significant differences between the three HRAs and the control feedback. Further analysis of a subscale which elicited subjects' opinions of the informative quality of the feedback revealed that two of the HRA feedback groups differed significantly from the control and the third HRA feedback group, $F(3,116) = 4.29$, $P = 0.007$. The most informative feedback was generated from the CDC−HRA and the commercially available HRA which yielded a risk score as the index of mortality risk.

Discussion

This study failed to support the premise that one type of HRA feedback was clearly superior to any other, or to a control consisting of readily available health education materials, with regard to self-reported behavior change. As to the informative quality of the feedback, no differences were observed between risk age or risk score as the principal statistic of mortality risk provided by an HRA. This finding suggests that concerns over the inaccuracies of various risk age algorithms may be avoided in favor of reporting risk on a continuum. Only a small percentage of the employees admitted making one or more recommended changes in their health habits as a

Table II. *Self-reported behavior changes following return of HRA or control feedback*

Behavior	Initiated recommended changes		Did not change	
	N	(%)	*N*	(%)
Seat belt use	19	(15.8)	101	(84.2)
Tobacco use[a]	0	(0.0)	51	(100.0)
Diet	29	(24.2)	91	(75.8)
Exercise	27	(22.3)	94	(77.7)
Alcohol use[b]	3	(3.9)	74	(96.1)
Stress management	10	(8.3)	110	(91.7)

[a]Non-smokers ($n = 70$).
[b]Non-drinkers ($n = 44$).

Table III. *Subjects' overall satisfaction with feedback*

Type of feedback	Means (SD)[a]	*n*
CDC−HRA	25.64 (4.066)	28
HRA (risk score)	26.27 (4.200)	33
HRA (risk age)	23.62 (5.934)	32
Control	23.84 (6.142)	25

[a]Range = 7 (very dissatisfied) to 35 (very satisfied).
$F = 3.136$ (3114) $P = 0.028$; Omega squared = 0.06.
Missing cases = 3 (2.5%).

result of the feedback they received (Table II). We do not suggest that HRAs are of no value as adjuncts to health-promoting interventions in worksites or other venues. Studies have supported the usefulness of HRA instruments in characterizing the general level of health in a population or structuring a health counseling session (Beery *et al.*, 1986; Hyner *et al.*, 1986). However, we suggest that purchasers of HRA instruments would be wise to request data supporting the purported superiority of a singular instrument over less expensive alternatives.

The 121 employees who completed the FQ were similar in risk status to those who completed the GQ but did not participate in the follow-up ($n = 79$). It is important to note that the employees who completed GQs were relatively young and generally average-to-low risk. The two HRAs classified only 27% of the subjects in a risk age 2 years or more above their chronological age. The HRA that generated a risk score classified only 12% of subjects in the 'fair' health category and none in the high-risk category. Such populations are typical of those who participate in worksite health promotion interventions (Beery *et al.*, 1986). Since the HRAs demonstrated that the majority of employees in this study were relatively free of significant health hazards, the feedback received by most of the subjects would positively reinforce their current lifestyles leading to few changes in reported health behaviors. We have stated elsewhere (Hyner and Melby, 1985) that this may be one of the major shortcomings of typical HRA feedback. Subjects with multiple risk factors that are not recognized as 'clinically significant' may be at greater total risk than individuals with singular physical or behavioral characteristics identified by an HRA. Professional assistance in interpreting HRA feedback should reduce the likelihood of 'victim-blaming' resulting from an inappropriate emphasis on unchangeable risks and frustration over how behavioral patterns can be altered.

Conclusions

In summary, while a small percentage of subjects indicated that the feedback did influence recommended changes in select health-related behaviors, none of the experimental feedback conditions proved to be significantly more influential than the others. Similarly, no evidence was found that clearly demonstrated the superiority of one type of HRA feedback over another, although two of the experimental HRA feedback conditions were determined to be more informative than either the control or a third HRA.

Future investigations should compare the long-term, singular effects of HRA-generated feedback with the effects of comprehensive health promotion programmes which include physical assessments, and combinations of both. Comparisons of HRAs and alternative educational strategies will help to identify the optimum means of reinforcing health habits and reducing risk in adult populations.

Acknowledgements

We wish to thank Elizabeth Townsend, Ronald Morgan and David Rowden for their support and assistance during the entire course of this investigation. Our sincere thanks to Sarah Weiser and Harlan Schweer for their assistance in the analysis of the data, and to Deborah B.Gray and Robert M.Petri for their help in the preparation of the manuscript.

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Received on September 15, 1986; accepted on March 5, 1987